made of a buffalo-horn, and ornamented with a white weasel's skin.

— A bottle thrown overboard near Pernambuco, Brazil, July 28, 1885, to assist in tracing the direction of ocean-currents, was found at Little Cayman, W.I., March 1, 1888, about thirty-two hundred miles from the starting-point. A note made upon this report at the Hydrographic Office, Navy Department, Washington, says that the bottle probably drifted along the Spanish Main into the Gulf of Darien, thence due north across the Caribbean Sea, passing around Jamaica between it and San Domingo and Cuba, and thence about west by north to Little Cayman, passing over a distance of about four thousand miles. Taking the average of the current at two knots an hour, the voyage occupied less than two and one-half months; so that the bottle was probably on the beach at Little Cayman more than two years before it was discovered.

## LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

*Twenty copies of the number containing his communication will be furnished free to any correspondent on request.*

*The editor will be glad to publish any queries consonant with the character of the journal.*

### Formation of the Explosive Chloride of Nitrogen by Electrolysis.

ON the 14th of this month I made the discovery that the chloride of nitrogen, a dangerously unstable compound, is formed during the electrolysis of a solution of ammonium chloride (sal-ammoniac). The difficulty and uncertainty of its formation by electrolytic analysis will be understood when it is remembered that nitrogen chloride is the resulting product only when numerous powerful chemical affinities are in equilibrium.

The operation may be successfully conducted as follows: a saturated solution of ammonium chloride (temperature 7° C.) contained in a suitable apparatus is electrolyzed between platinum electrodes, care being taken to shield the solution from direct sunlight. After the decomposition has proceeded for some time, — chlorine being evolved at the positive electrode in minute bubbles, which are absorbed by the solution, — small particles of a light-yellow liquid, with a most peculiar oily appearance, will be observed to collect on the surface. These soon combine to form small globules, which sink slowly to the bottom of the vessel. If a warm solution be electrolyzed in a brightly lighted room, no such results will be obtained; the nascent chlorine decomposing the solvent water to form hydrochloric acid.

As this substance is one of a class of compounds which explode violently by a rapid dissociation of their constituent elements, the following precautions are necessary to insure safety: 1st, the temperature of the solution must not be allowed to rise above 10° C.; 2d, the apparatus must be of the strongest construction, scrupulously clean, and not exposed to an intense light; 3d, if a powerful battery is used, it must be disconnected from the apparatus immediately upon the formation of the first drop of the explosive; and, 4th, it is prudent for the operator to protect himself by means of globes and a strong mask.

The chloride of nitrogen as thus prepared is a highly volatile, limpid, oily liquid, with an extremely pungent odor. It evaporates rapidly when exposed to the air, producing an unwholesome vapor. The stability of this substance seems to be in an inverse ratio to the rapidity of its formation, the maximum of safety being attained by the production of about four drops an hour. If the electro-motive force of the battery be but little in excess of that required for complete electrolysis, the explosive may be allowed to collect in the apparatus, where it will be gradually and harmlessly decomposed by the electric current.

This dangerous compound was first prepared in the year 1811, by Pierre Louis Dulong, an eminent French physicist, during a series of experiments on the chlorine compounds. Owing to the serious injuries he received on that occasion, Dulong thought it best to keep the discovery a secret, lest others should be tempted to repeat his perilous experiments. This precaution had, however, an unfortunate result; as Sir Humphry Davy, a few years later having rediscovered the same compound, and being ignorant of its nature, was also injured by its violence.

In view of the fact that the salts of ammonia are present in the oxidizing liquids of so many electrical batteries in use at the present day, the subject has, I think, considerable practical importance. May not this dangerously explosive compound be formed, under certain circumstances, by the electrolytic actions necessary for the proper working of the battery? Perhaps some of the readers of *Science* will be able to furnish information on this point.

In the mean time I will continue these investigations to ascertain, if possible, the nature and quantity of the remaining products of the decomposition, the action of different solvents, and the results to be obtained by substituting other ammoniacal salts for ammonium chloride. I will also observe more closely the nature of the explosive, and its behavior when acted upon by high potential electric currents.

WILLIAM B. HALE.

Clinton, Ontario, Can., April 18.

### Indian Graves.

ON the 17th of April some men were employed in scraping out a cellar on West Oneida Street in Baldwinsville, N.Y., and threw out several Indian skeletons. The scraper broke these badly, especially the skulls, but yet some interesting facts could be observed. I was able to get tolerable horizontal measurements of two skulls; the circumference of one being 20⅝ inches, and of the other 19½ inches. But for being broken, another was in very fine condition. It was that of a young person.

That this was a case of horizontal burial seemed probable, but was made certain the next day by the careful opening of another grave a few feet away. In this case the skeleton lay with its feet to the north, the knees being drawn up; the hands were brought up to the neck; and, while the head lay to the south, the face was turned to the west, the body having been placed on its side. In previous gradings and successive ploughings, the earth had been partly removed and the skull shattered. The soil was of fine gravel and sand, sloping to the south, and on the hill a little to the north had been an Indian village. No relics were found with the bodies, nor do they seem common in these horizontal burials here.

This was on the north side of Seneca River. In the autumn of 1886 I witnessed the opening of another burial-ground in the village on the south side. The size, condition, and position of the skeletons were much the same, and I was able to make several careful measurements. This was close by a level site of an early Indian village, affording much earthenware. The soil was a clear sand loam, unmixed with gravel; but under almost every skeleton was a small stone. There were no relics; and, though the skeletons lay on one side horizontally, there was some coufusion, and apparently no attempt to face the west.

Four modes of Indian burial are known in Onondaga County, and possibly five. The oldest seems to have been the horizontal mode, not at full length, but with the limbs drawn up, and with no articles in the grave. In a single instance a kind of mound-burial has been found, where the bodies were laid horizontally, with some articles, and the earth heaped over them in a mound of considerable size. I was fortunate enough to get a picture of this before its removal. The third made was that of the early Onondagas, who entered the county early in the seventeenth century. Before they came into central New York, they probably used ossuaries, like the Hurons, but there are no known instances around their later homes. When the French entered Onondaga, the local mode was to put the body in a sitting posture, placing some articles with it. Under European influence, this gradually changed, and the burial was much as with us, a century ago. In other places there have been other modes, as in the burial of several, one above another, in Cayuga County, and reported circular burials elsewhere. One curious grave has been brought to my attention by Otisco Lake. In this were two kinds of paint, and two long tubes of light-green clay, resembling the green gypseous shales, with flint arrow-heads. Two skeletons lay side by side, and the rare relics point to an early day.

W. M. BEAUCHAMP.

Baldwinsville, N.Y., April 18.